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IS THERE AN ASSOCIATION OF HEAVY DRINKING WITH ACUTE ILLNESS AMONG COLLEGE STUDENTS IF SMOKING STATUS IS CONTROLLED?

Working paper for departmental presentation. Indiana University, Bloomington, IN
and Indianapolis, 1993¹

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ABSTRACT

Background: Smoking has been shown to be associated with a higher incidence of chronic diseases among older adults and acute illnesses among young adults. Heavy alcohol intake has been found to be associated with a higher incidence of chronic and acute diseases among older alcoholics *Purpose:* the purpose of the study was to determine if there was an association of acute illness and alcohol intake among a sample of college students if smoking is controlled. *Methods:* The Health and Lifestyle Questionnaire was administered to a sample of 1,281 students in the 1991-1992 academic year to personal health classes at a large mid-western university. The questionnaire contains items concerning drinking, smoking, drug use, and lifestyle questions such as exercise, diet, etc. along with acute illnesses such as upper respiratory infections, gastro-intestinal and STDs. *Results:* Although there was an association between smoking and drinking levels, there was no significant effect from smoking in terms of acute health problems. In addition, no increase in acute health issues or upper respiratory infections were found with students who consumed between one and 21 drinks per week. However, students drinking 28 or more alcoholic drinks per week had significantly more health problems; those drinking more than 22 drinks per week had more upper respiratory infections compared to the other students including nondrinkers. It was *concluded* that excessive alcohol intake alone increased the risk of respiratory infections and acute illnesses in this sample of college students, but more moderate alcohol consumption had little effect on the risk for these health problems.

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INTRODUCTION

It has been established that smoking is associated with acute illness such as a cough or upper respiratory infections among both young and older adults. For example, the *Surgeon General's Reports on Smoking and Health* (1979) notes adverse effects of cigarette smoking on acute respiratory infections based upon a number of studies. In addition a higher age-adjusted incidence of self-reported influenza and smoking has been found (Milne & Williamson 1972). Blake, Abell & Stanley (1988) found that young military recruits who smoked during basic combat training had more upper respiratory infections compared to nonsmokers. Thus a basic assumption is that smoking among college students might lead to increased incidence of self-reported illnesses.

The literature also suggests that alcohol consumption can increase health problems and infectious diseases. There is evidence of increased incidence of infections among alcoholics (Roselle, 1992). For example, it is well known that chronic alcoholics have increased incidence of bacterial pneumonia (Nelson et al, 1992; Winterbauer, Bedon & Ball, 1969). Chronic alcoholism is also associated with tuberculosis (Jacobson, 1992). One explanation proposed for this phenomenon is that alcohol suppresses the immune system as has been found by (Aldo-Benson, 1989; Aldo-Benson, et al. 1992). On the other hand, others have indicated no immune system suppression (Grossman, Mendenhall & Roselle, 1988). A problem with this line of research is that most investigations of alcohol on the immune function and illness have used chronic alcoholics as subjects (Watson, et al, 1985). Thus, results found with this problem drinking population may be confounded with the damage due to heavy alcohol ingestion over time on various organ systems.

Few studies have examined the effect of alcohol consumption on college students and possible acute illness. In general, college students are healthy, but they do develop infectious diseases and other acute health problems. Urinary tract, sexually transmitted, upper respiratory, and streptococcal infections are commonly reported (Faigel, 1990; Christmas & Berkowitz, 1989). At the large Midwestern university where data for this study were collected, approximately 45,000 visits to the student health center for a campus of over 30,000 students occurred during the 1991-1992 academic year (Reese, 1993). However, the center does not break visits into different categories such as infectious diseases and other illnesses.

The drinking habits of college students in the United States have been well described and characterized over the past 20 years by the first author and colleagues (Engs 1977, 1990; Engs and Hanson, 1985, 1988, 1989, 1990, 1993). These studies suggest that about 80% of all college students consume alcohol at least once a year with men consuming more than women.

About 20% of students are heavy drinkers. Acute conditions related to alcohol intoxication such as hangover, vomiting or injuries are common among this group (Hanson and Engs, 1992; Meilman, et al, 1989). Because college students tend to be relatively healthy, they were considered ideal for a study examining the risk of infectious illness, and acute health problems associated with alcohol intake.

Thus the purpose of this study was to examine acute and infectious illness in relation to the mean amount of alcohol consumed per week and to control for possible effects of smoking on illness among a sample of college students.

METHODS

Subjects

During the 1991-1992 academic year, almost 1,200 undergraduate students were enrolled in the general education survey course "personal health" at a large Midwestern university. Students attending this course were from all majors and class years. The *Lifestyle Questionnaire*, described below, was administered to these students during the first week of class. The questionnaire was completed by 1,150 students. Of these responses, 35 cases were rejected due to obviously faked responses, i.e., consuming 99 beers a day, or incomplete data, leaving a total sample of 1,115 students. There were 484 men and 631 women, a proportion similar to that of men and women attending institutions of higher learning (Snyder 1991). All subjects were between 17 and 35 years of age (mean age 19.6 ± 3.2) and were assumed to be basically healthy.

Lifestyle Questionnaire Development

The *Lifestyle Questionnaire* (also called the *Student Health and Lifestyle Questionnaire*), to test for self-reported illness and lifestyle behaviors such as alcohol consumption and smoking, was developed based upon items in two survey instruments used previously by the first author (Engs 1975, 1977; Engs, Gliksman & Smythe, 1987). Items selected for incorporation into the new questionnaire included common student health problems and those that measure drinking patterns.

Since the authors wished to test the hypothesis that drinking is associated with infectious diseases, various symptoms of upper respiratory infections including cough, sore throat, cold or flu, bronchitis were included. In addition health problems related to the consequences of episodes of heavy drinking such as stomach upset, nausea and diarrhea were used along with injuries and accidents. Other health problems common to students such as sexually transmitted diseases, urinary tract and vaginal infections, and skin and emotional problems were also asked.

Reliability of the instrument and calculation of Health Problem Scores

Because a total score for an aggregate of health problems was desired for this study, a reliability and validity procedures were carried out for this new instrument. Face validity of the instrument was assessed by asking 90 students to clarify all illness related items. The test-retest reliability was accomplished with 206 students. The instrument was administered on two occasions with an interval of two weeks. The test-retest reliability coefficient was .89. Seven items with reliability coefficients less than .20 were eliminated from the questionnaire.

Construct validity to determine possible underlying themes for different health categories was tested by use of the factor analysis technique which gave six factors. Since there were low correlations among the six factors, a regression analysis was carried out to derive a formula for calculating a Total Health Problem Score. Three factors accounted for 85% of the variance, namely Gastrointestinal, Upper Respiratory Infections, and General Malaise. Symptoms clustered in the Upper Respiratory factor included sore-throat, a cold or the "flu", cough, bronchitis or laryngitis, and ear infection; the Gastrointestinal factor included stomach upset, nausea or vomiting, and diarrhea; and the General malaise factor included headache and lack of energy. Cronbach's Alpha measurement of homogeneity for the items indicated a reliability coefficient of .70 for the instrument.

To calculate an illness category score, students were asked to indicate how many times they had experienced a given health problems during the previous month. The number of each responses was tallied within the appropriate illness category. For example, if a student indicated h/she had suffered once from a cold, twice from a cough and none for a sore throat, a score of 3 (three) would be calculated for the Upper Respiratory Infections category.

The three illness categories were used to calculate the Total Health Problem Score using the following regression formula resulting from the analysis: *Total Illness Score = 1.3 + 1.1(Upper Respiratory Infections) + 1.6(Gastrointestinal) + 1.0(General Malaise)*. It needs to be kept in mind that this score is not the number of illnesses the student experienced, but rather a weighted total score determined by regression analysis of the factors and represents an aggregate of the health problems.

Drinking and smoking consumption

To estimate *drinking behaviors*, the six Quantity-Frequency items from the Student Alcohol Questionnaire were used (Engs, 1977, 1987). Students were requested to indicate the average frequency of drinking beer, wine and spirits and the average number of these drinks consumed

on any one occasion during the past month. A mean number of drinks consumed per week for all alcoholic beverages was obtained.

To calculate the mean number of drinks, or units of alcohol, per week of all alcoholic beverages consumed, a method described by Lemmon, Tan & Knibbe (1988) and adapted by Engs (1990) was used. Calculations for this method are based upon the "rule of thumb" that an average can or glass of tavern beer (12 ounces) is roughly equivalent to an average size glass of wine (5 ounces) or shot of spirits (one and half ounce) in terms of grams (approximately 13) of absolute alcohol (Consumer and Food Economics Institute, 1990).

For this study the mean number of drinks consumed per week was assessed as follows. Loading values for the frequency of consuming each beverage were assigned the following numbers. "Every day" = 7, "Two or three times a week" = 3.5, "Once a week" = 1, "At least once a month but less than once a week" = .25, and "not at all" = 0. This loading value was multiplied by the average number of drinks consumed at any one sitting for each of the three beverages. The products of these three results were summed giving the mean number of drinks consumed per week for all alcoholic beverages. The mean number of drinks per week were categorized in Quantity-Frequency consumption levels as follows: Under 1 = "abstainer," 1-7 = "light," 8-14 = "moderate," 15-21 = "moderate-heavy," 22-28 = "heavy" and 29 plus = "at risk drinker."

To provide a Quantity-Frequency score for *smoking* of cigarettes, the number of cigarettes smoked per day was assessed. This result was multiplied by the same loading value used for the alcohol frequency as described in the previous paragraph for cigarettes per week.

Study Design and Statistical Analysis

A Cross sectional design was used. For analysis, a uni-variant one-way analysis of variance was used to test differences between Total Health Problem Scores, Upper Respiratory Infections and Gastrointestinal problems and each drinking category. For resulting significant differences, the post-hoc Scheffe test was used to identify pairs of means which differed significantly. Because men and women differ in their drinking patterns (Engs and Hanson 1990), they were initially analyzed separately.

The data were then analyzed with cigarette consumption to control for any differences due to smoking. For this analysis, a 2 (smoking status) X 6 (drinking levels) design was used. A one-way analysis of variance calculation of the MANOVA Statistical Package for Social Science (SPSS)[Norusis, 1990] was utilized for each of the categories.

RESULTS

The mean amount of alcohol consumed for the total group was 10.4 drinks per week. As has been found in most studies, men consumed significantly ($p < .001$) more drinks per week than women (15.7 and 5.7 respectively). This consumption is similar to a recent national study of college students using the same questionnaire where the total amount consumed was 11.4 drinks per week for the total sample, 16.3 drinks per week for men and 8.2 for women (Engs 1990).

The mean score and standard deviation for the Total Health Problem Score for the total sample was 22.4 ± 22.3 . The mean scores for Upper respiratory, Gastrointestinal and General malaise were 5.8 ± 10.0 , 4.1 ± 8.0 , and 7.9 ± 8.6 respectively. There were no significant differences between men and women on the Total Health Score (22.2 and 22.1), Upper Respiratory (4.3 and 3.9) or the Gastro-intestinal (6.5 and 5.3) scores respectively. Because there was no significant difference in these scores between men and women the combined sample was used for the rest of the analysis.

Drinking and health problem scores

Results of the uni-variant one-way ANOVA shows a significant difference ($p < .001$) between the drinking levels and the Total Health Problem Score (See Table 1) The post-hoc Scheffe test revealed the significant pairs occurred between individuals drinking over 28 drinks per week and those consuming seven or less per week (See Table 2).

When the Upper Respiratory score was analyzed, the ANOVA revealed a significant difference ($p < .001$, $F=5.2$, $df=5$, $df=1109$, Sum of Squares=2555.5, Mean Squares=511.1) between the different drinking levels. The post-hoc test revealed that the Upper Respiratory score was significantly greater among the "heavy" drinkers (22 to 27 drinks per week), compared to those who consumed fewer than seven drinks per week (Table 2).

When Gastrointestinal problems alone were examined, a significant ($p < .05$) difference between the drinking groups ($F=2.5$, $df=5$, $df=1109$, Sum of Squares=801.8, Mean Squares=160.4) was revealed. However, the post-hoc analysis showed no differences between any two pairs of mean scores. There was no significant difference between or within any variable for the Malaise Score.

Smoking and health problem scores

Further analysis was carried out to determine whether the results could be due to smoking and not drinking. The results of the 2 (smoking) X 6 (drinking levels) analysis of the Total Health Problem Score showed a significant ($p < .05$) main effect between the six levels of alcohol

consumption independent of smoking. There was no significant interaction between drinking levels and smoking status for Total Health Problems (Table 3).

Results for Upper Respiratory problems, also, revealed a significant ($p < .01$) main effect between the six levels of alcohol consumption independent of smoking. Likewise there was no significant interaction between drinking and smoking for the Upper Respiratory score (Table 4). No significant differences for the gastrointestinal problems with either smoking or alcohol consumption were found.

Since an association with drinking and smoking levels for the Total Health Problem and for Upper Respiratory Infection scores was found, a stepwise multiple regression analysis for each of these two variables was calculated. The results revealed that 4% of the explained variance was due to alcohol ($F=34.8$, $df=1$, $df=965$, Sum of Squares 16704.3, $p < .001$, $r^2=.04$). There was no significant effect from smoking. For Upper Respiratory Infections, the regression analysis revealed that 1% of the explained variance was due to alcohol consumption and that there was no significant effect from smoking ($F=8.8$, $df=1$, $df=965$, Sum of Squares=15.0, $p < .01$, $r^2=.01$).

DISCUSSION

The data show that alcohol consumption of over 28 drinks per week was associated with a higher total Health Problem Score which included gastrointestinal, upper respiratory and general malaise problems. General malaise problem, such as headaches, along with gastrointestinal symptoms, could result from acute alcohol intoxication. A primary purpose of this study was to determine the effect of alcohol consumption upon infectious illness as an indirect measure of general immune function. The data show that increased risk of acute upper respiratory infections occurred among those students consuming over 22 drinks a per week. These associations are not due to the fact that heavy drinkers also smoke more, because the relationship occurs even in nonsmokers; drinking was significant while controlling for a smoking effect.

The regression analysis suggests that upper respiratory infections were only weakly predicted by heavier drinking. Smoking was not predictive of upper respiratory infections. Moreover, the positive association of alcohol consumption and upper respiratory infections hints at immune function depression among these heavier drinkers. Of course, other factors and behaviors associated with heavy drinking among these university students could have also depressed immune function and contributed to the results such as late night parties leading to lack of sleep, erratic eating patterns leading to poor nutrition, contact with contagious people in crowded taverns, and stress. It is recommended that research including these variables and

differing amounts of alcohol ingestion in relationship to immune function be carried out to clarify this issue.

Most interesting was the finding in this sample of students was that up to a mean of 21 drinks per week was not associated with increased incidence of Upper Respiratory infections. This suggests that "moderate" (7-14 drinks per week) to "moderate-heavy" (15-21 drinks per week) alcohol consumption, did not add to acute health risks among these students. This is in agreement with other research which suggest that alcohol consumption from 1 to 3 or even 4 drinks per day, may have few harmful, and even a beneficial effects, on health (Bofetta and Garfinkel 1990; Rimm, et al. 1993; Garg, Wagner & Madans 1993).

It was concluded that consuming over 22 drinks a week is associated with increased upper respiratory infections and over 28 drinks per week is associated with acute illness among this sample of university students.

REFERENCES

Aldo-Benson, M.A. (1989) Mechanism of alcohol induced suppression of B cell response. *Alcoholism Clinical and Experimental Research*, 13,469-472.

Aldo-Benson, M.A., Kluge-Beckerman, B., Hardwick, J., & Lockwood, M. (1992) Ethanol inhibits production of mRNA for kappa light chain in stimulated B lymphocytes. *Journal Laboratory Clinical Medicine*, 119,80-82.

J G Bachman, L. D. Johnston, and P. M. O'Malley. (1981) Smoking, drinking, and drug use among American high school students: correlates and trends, 1975-1979. *American Journal of Public Health* January 71(1), 59-69.

Blake G.H., Abell T.D., Stanley W.G. (1988) Cigarette smoking and upper respiratory infection among recruits in basic combat training. *Ann Intern Med.* Aug 1;109(3),198-202.

Bofetta, P. & Garfinkel, L. (1990) Alcohol drinking and mortality among men enrolled in an American Cancer Society prospective study. *Epidemiology*, 1,342-348.

Christmas, W.A. & Berkowitz, S.D. (1989) Sexual behavior and the structure of STDs on a college campus. *Journal American College Health*, 38,40.

Consumer and Food Economics Institute.(1990) *Composition of foods, Handbook 8 Series*. Washington, DC: US Department of Agriculture.

Engs, Ruth C. (1990) Family Background of Alcohol Abuse and Its Relationship to Alcohol Consumption among College Students: Unexpected Finding. *Journal of Studies on Alcohol*, 51(6) 542-547.

Engs, Ruth C. Drinking patterns and drinking problems of college students (1977). *Journal Studies of Alcohol*, 38,2144-2156.

Engs, Ruth C. (1987, 1975) *The Student Alcohol Questionnaire and the CODE*. Located in IUScholarWorks Repository: <http://hdl.handle.net/2022/17206> and The Student Alcohol Questionnaire located at <http://hdl.handle.net/2022/17153>

Engs, R.C. & Hanson, D.J. (1990) Gender differences in drinking patterns and problems among college students: A review of the literature. *Journal Alcohol and Drug Education.*, 35, 36-47.

Engs, Ruth and David J. Hanson. (1988) University Students' Drinking Patterns and Problems: Examining the Effects of Raising the Purchase Age. *Public Health Reports*, November-December, 6, 103-105.

Engs, Ruth C. and David J., Hanson (1989). Reactance Theory: A test with collegiate drinking. *Psychological Reports*, 64: 1083-1086.

Engs, Ruth C. and David J. Hanson (1985) The Drinking Patterns and Problems of College Students: 1983. *Journal of Alcohol and Drug Education Education*. 31(1):65-84.

Engs, R. C. & D. J. Hanson. (1990) Gender Differences in Drinking Patterns and Problems Among College Students: A Review of the Literature. *Journal of Alcohol and Drug Education* 35(2),36-47.

Engs R.C., Hanson D.J., Gliksman L.(1990) Influence of religion and culture on drinking behaviors: A test of hypotheses between Canada and the U.S.A. *Brit J Addiction*. 85:1474-1482.

Engs, R.C, L. Glicksman, C. Smyth Ontario Lifestyle, Alcohol, and Drug Questionnaire 1987. Located in IUScholarWorks repository at <http://hdl.handle.net/2022/17184>

Faigel, H.C. (1990) The relationship between urinary tract infections and the collegiate academic calendar. *Journal American College Health*, 39,77-81.

- Garg, R., Wagener, D.K., & Madans, J.H. (1993) Alcohol consumption and risk of ischemic heart disease in women. *Archive of Internal Medicine*, 153,1211-1216.
- Grossman, C., Mendenhall, C.L. & Roselle, G.A.(1988) Alcohol and immune regulation in vivo effects of ethanol on concanovation: A sensitive thymic lymphocyte function. *International Journal Immunopharmacology*, 10,187-195.
- Hanson, D.J. & Engs, R.C. (1992) College students' drinking problems: A national study, 1982-1991. *Psychological Reports*, 71,39-42.
- Lemmens, P., Tan, E.S., & Knibbe, R. (1988) Comparison of indices of alcohol consumption: Issues of validity of self-reports, Paper presented at the Fourth Annual Alcohol Epidemiology Symposium Berkeley, California, June 5-11.
- Milne J.S. & Williamson J. (1972) Respiratory Symptoms and Smoking Habits in Older People with Age and Sex Differences. *Respiration* 29,359–370.
- Meilman, P.W., Yanofsky, N., Gaylor, M.S. & Turco, J.H. (1989) Visits to the college health service for alcohol-related injuries. *Journal College Health Association*, 37,205-210.
- Nelson, S., Shellito, J., Mason, C. & Summer, W.R.(1992) Alcohol and bacterial pneumonia. *Alcohol Health and Research World*, 16,73-80.
- Norusis, M. (1990) *SPSS Advanced Statistics: Student Guide*, SPSS INC.: Chicago.
- Jacobson, J.M. (1992) Alcoholism and tuberculosis. *Alcohol Health and Research World*, 16,39-47.
- Reese, Anne (1993) Private Communication. Indiana University Student Health Center, Bloomington, IN.
- Rimm, E.B., Giovanucci, E.L., Willett, W.C., Colditz, G.A., Ascherio, A., Rosner B & Stampfer, M.J. (1991) Prospective study of alcohol consumption and risk of coronary disease in men. *Lancet*, 338,464-468.
- Roselle, G.A. Alcohol and the Immune System (1992). *Alcohol Health and Research World*, 16,16-19.

Snyder, T.D. (1991) *Digest of Education Statistics, 1991*, Department of Education: Washington, DC.

US Department of Health, Education, and Welfare. (1979) *Smoking and Health A Report of the Surgeon General*. Washington: U.S. Department of Health, Education, and Welfare, Public Health Service, Office of the Assistant Secretary for Health, Office on Smoking and Health;. DHEW Publication No. (PHS) 79-50066.

Watson, R.R., Jackson, J.C., Hartmann B., Sampliner, R., Mobley, D. & Eskelson, C. (1985) Cellular immune function, endorphins and alcohol consumption in males. *Alcoholism, Clinical and Experimental Research*, 9,248-254.

Winterbauer, R.H., Bedon, G.A.,& Ball, W.D. (1969) Recurrent pneumonia predisposing illness and clinical patterns in 158 patients. *Annals of Internal Medicine*,70,689-700.

Selected presented papers on college student drinking, smoking and substance use that might be of interest are now located in IUScholarworks repository are as follows

Engs, R. C. and Hanson, D.J. (1986) Alcohol knowledge among collegians: 1983-1985. Paper presented: *Annual Meeting of the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD)*, Cincinnati, OH, April 10-12, 1986. Retrieved from IUScholarWorks repository: <http://hdl.handle.net/2022/17284>

Engs, Ruth C. (1977) Alcohol knowledge and drinking behavior at thirteen colleges and universities (And Development of the Student Alcohol Questionnaire) Paper Presented: *American College Health Association National Conference*, Philadelphia, Pennsylvania, March, 1977.. Retrieved from the IUScholarWorks repository at <http://hdl.handle.net/2022/17181>

Engs, R.C. and Hanson, D.J. (1988). Alcohol knowledge and drinking patterns of nursing students: 1983 - 1985: Implications for Nursing Education. Paper presented: *35th International Congress on Alcoholism and Drug Dependence*. Oslo, Norway, 31 July - 6 August, 1988. Retrieved from IUScholarWorks: <http://hdl.handle.net/2022/17287>

Engs, R. C., Glicksman, L and Smythe, C. (1990) Alcohol use and associated problems: American vs Canadian students. Implications for public policy Paper Presented: *International Congress on Alcohol and Addiction (ICAA)*, Berlin, Germany, June, 1990. Located in IUScholarWorks repository at <http://hdl.handle.net/2022/17233>

Engs, Ruth C. (1992) An updated reliability of the student alcohol questionnaire (SAQ) for researchers. Bloomington, IN: White Paper, 1992. Located in IUScholarWorks repository: <http://hdl.handle.net/2022/17182>

Engs, Ruth (1989) Assessing construct validity and re-assessing the reliability of the health concern questionnaire. Paper presented: Research Section, *Annual Meeting of the American Alliance for Health, Physical Education, Recreation, and Dance*, Boston, MA, April 23, 1989. Located in IUScholarWorks repository: <http://hdl.handle.net/2022/17251>

Engs, R.C. (1983) College student drinking patterns over time: 1974-1983. Paper presented: *ADPA Higher Education Conference*, March 1, 1983, Chicago. IL. Located in IUScholarworks repository: <http://hdl.handle.net/2022/172812>

Engs, R.C. Hanson, D.J. (1986) Correlates of drinking problems and knowledge of alcohol among collegians over time: implications for education, in policy and the college community. Paper presented: *NIAAA/NIDA First National Conference on Alcohol and Drug Abuse Prevention*, Washington, D.C., August 6, 1986. Located in IUScholarworks repository: <http://hdl.handle.net/2022/17285>

Engs, Ruth C. (1995) Demographic characteristics associated with non-consensual sex among a national sample of students: Implications for school health education. Paper presented: *69th Annual Conference of the American School Health Association (ASHA)*, Milwaukee, WI, October 1995. Retrieved from IUScholarWorks repository: <http://hdl.handle.net/2022/17328>

Engs, R. C. DeCoster, D, Larson, R.V. & McPheron, P. (1977) Does alcohol education work? the evaluation of a university alcohol education program. Paper presented: *American Personnel and Guidance Association National Convention*, Dallas, TX, March, 1977 Retrieved from IUScholarWorks Repository:: <http://hdl.handle.net/2022/17258>

Engs, R.C and Hanson, D.J. (1993) Drinking games among moderate and heavy drinkers: influence of demographic variables . Paper presented: *Annual Conference of the American School Health Association*, Pittsburgh, PA, October. 1993. Located in IUScholarWorks Repository: <http://hdl.handle.net/2022/17299>

Engs, R.C and Hanson, D.J. (1983) The drinking patterns and problems of college students - 1983: Paper presented: *Alcohol Drug Problems Association Annual Conference*, Washington, D.C., August 29, 1983. Located in IUScholarWorks repository: <http://hdl.handle.net/2022/17281>

Engs, Ruth C. Drinking patterns and problems of college women, *National Conference on Women's Issues, Alcohol Drug Problem Association (ADPA)*, Denver, May, 1987. <http://hdl.handle.net/2022/17286>

Engs, Ruth C. (1994) Drinking patterns of American university student: testing reduction of consumption theory 1982-1994. Paper Presented, *Department of Psychology, Research Colloquium*, University of Dundee, Dundee, Scotland, October, 1994. Located in IUScholarWorks repository: <http://hdl.handle.net/2022/17314>

Engs, Ruth (1988). Drinking Patterns of Nursing Students over Time: 1983 - 1987 Implications for Nursing Education. Paper presented at *Impaired Health Professionals AMA Conference*. Chicago, Illinois, USA. 27-28 October, 1988. Retrieved from the IUScholarWorks repository at <http://hdl.handle.net/2022/16879>

Engs, R.C. & Hanson, D.J. (1988) Drinking patterns of university students over a seven year time period: The Effect of Raising the Drinking Age. Paper presented *35th International Congress on Alcoholism and Drug Dependence*. Oslo, 31 July - 6 August, 1988. Located in IUScholarworks repository: <http://hdl.handle.net/2022/17296>

Engs, Ruth C. (1981) The drug taking patterns of nursing, medical, and pharmacy students in Brisbane, Australia. Paper presented: *National Council on Alcoholism, Conference*, (Nursing Section), New Orleans, April 10, 1981. Retrieved from the IUScholarWorks repository at <http://hdl.handle.net/2022/17185>

Engs, R.C.; Zhou-Ping, L.(1994) The health concerns of students in Guangxi, china. Paper presented: Research Section. *Annual Meeting of the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD)*, Denver, Colorado, April 1994.

Engs, R.C. & Hanson, D.J. (1989) High risk students: Comparison of the percent of drinking students who exhibited behavior related to drinking during 1987-1988. Paper presented: *Alcohol Drug Problems Association 40th annual conference*, Washington, DC, August 1989. Retrieved from IUScholarworks Repository: <http://hdl.handle.net/2022/17315>

Engs, Ruth C. (1979) A national study of drinking patterns among university students. Paper presented: *32nd International Congress on Alcoholism and Drug Dependency*, Warsaw Poland September, 1979. Located in the IUScholarWorks repository at <http://hdl.handle.net/2022/17154>

Engs, R. C. & Hanson, D.J.(1988) Reactance theory and drinking legislation. Paper Presented: *Annual Meeting, Eastern Sociological Association*, New York, October 8, 1988. Located in IUScholarworks repository:
<http://hdl.handle.net/2022/172967>

Engs, R. C . Relationship between co-dependency and drinking problems: A negative result, *Annual Meeting of the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD)*, Boston, MA, April 23, 1989: <http://hdl.handle.net/2022/17298>

Table 1: Result of the ANOVA for the Total Health Problem score for each drinking level among 1115^a university students at a large mid-western university.

Source of Variation	df	Sum of Squares	Mean Squares	F
Between Groups (6 drinking levels)	5	12823.1	2564.6	5.2*
Within Groups	1109	5421145.8	488.9	
TOTAL	1114	554969.0		

a. Because of data missing from some items, not all calculations included the total sample of 1,126 students.

*p< .01

Table 2: Mean drinks per week by total health problem score, upper respiratory infections and gastrointestinal illness scores rounded to nearest whole number for 1,115 university students during the 1991-1992 academic year.

<u>Mean drinks/Week</u>	<u>Total Health Problem Score</u>	<u>URI Problem Score</u>	<u>GI Problem score</u>
0	20*	4+	3
< 8	19	5	3
8-14	23	6	4
15-21	24	5	5
22-28	27	11+	6
>28	29*	8	6

* The post-hoc Scheffe test revealed the significant pairs occurred between individuals drinking over 28 drinks per week and those consuming seven or less per week.

+ Post-hoc Scheffe revealed the significant pairs were between those who consumed 22-27 drinks per week and less than 7 drinks per week.

Table 3: Result of 2 (smoking) X 6 (drinking level) ANOVA for the Total Health Problem score among 1,115 university students at a large mid-western university

Source of Variation	df	Sum of Squares	Mean Squares	F
Within Cells	1103	536993.2	486.8	
Six Drinking Levels	5	7570.0	1514.0	3.1+
Smoking Status	1	3637.5	3637.5	7.5+
Drinking Level by Smoking Status	5	2716.4	543.3	1.2

* p <.01

Table 4: 2 (Smoking) x 6 (Drinking Level) Analysis of Variance for Upper Respiratory Infections among 1,115 university students at a large mid-western university

Source of Variation	df	Sum of Squares	Mean Square	F
Within cells	1103	108127.8	98.0	
Six drinking levels	5	1479.4	295.9	3.0*
Smoking status	1	533.2	533.2	5.4*
Drinking level by Smoking status	5	575.6	115.1	1.2

* p < .01